

**What is claimed is:**

- 1        1.    A driving apparatus for receiving an input voltage  
2        at an input terminal and generating an output voltage at an  
3        output terminal, comprising:  
4        an output buffer electrically coupled between the input  
5        and output terminal; and  
6        an operational amplifier electrically coupled between  
7        the input and the output terminal, and  
8        selectively turned on to drive the output voltage  
9        to a voltage level substantially the same as the  
10       input voltage.
- 1       2.    The driving apparatus as claimed in claim 1,  
2       wherein the operational amplifier is turned off when a level  
3       of the input voltage is higher than a predetermined  
4       threshold.
- 1       3.    The driving apparatus as claimed in claim 1,  
2       wherein the operational amplifier is turned off when a level  
3       of the input voltage is lower than a predetermined  
4       threshold.
- 1       4.    The driving apparatus as claimed in claim 1,  
2       wherein the output buffer comprises:  
3       a bias circuit activated during a first period to  
4       generate bias voltages; and  
5       a source follower activated and biased by the bias  
6       voltages during a second period after the first  
7       period, and inactivated during a third period  
8       after the second period.

1        5.    The driving apparatus as claimed in claim 4,  
2    wherein the operational amplifier is turned on during the  
3    third period.

1        6.    The driving apparatus as claimed in claim 4,  
2    wherein the operational amplifier is turned on during a part  
3    of the second period.

1        7.    The driving apparatus as claimed in claim 4,  
2    wherein the output buffer further comprises a short circuit  
3    for selectively shorting the input terminal and the output  
4    terminal.

1        8.    The driving apparatus as claimed in claim 7,  
2    wherein the short circuit is activated during a fourth  
3    period after the third period.

1        9.    The driving apparatus as claimed in claim 1,  
2    wherein the operational amplifier is an unit gain  
3    operational amplifier.

1        10.   A driving apparatus for receiving an input voltage  
2    at an input terminal and generating an output voltage at an  
3    output terminal, comprising:  
4        an output buffer receiving the input voltage and  
5           pulling the output voltage up to a first level  
6           higher than the input voltage during a first  
7           period; and  
8        an operational amplifier electrically coupled between  
9           the input and the output terminal, and  
10        selectively turned on to pull the output voltage

11 down to a second level substantially the same as  
12 the input voltage during a second period after  
13 the first period.

1 11. The driving apparatus as claimed in claim 10,  
2 wherein the operational amplifier is turned off when a level  
3 of the input voltage is higher than a predetermined  
4 threshold.

1 12. The driving apparatus as claimed in claim 10,  
2 wherein the operational amplifier is turned off when a level  
3 of the input voltage is lower than a predetermined  
4 threshold.

1 13. The driving apparatus as claimed in claim 10,  
2 wherein the output buffer comprises:  
3 a bias circuit activated during a third period before  
4 the first period to generate bias voltages; and  
5 a source follower activated and biased by the bias  
6 voltages during the first period.

1 14. The driving apparatus as claimed in claim 13,  
2 wherein the output buffer further comprises a short circuit  
3 for selectively shorting the input terminal and the output  
4 terminal.

1 15. The driving apparatus as claimed in claim 14,  
2 wherein the short circuit is activated during a fourth  
3 period after the second period.

1        16. The driving apparatus as claimed in claim 10,  
2 wherein the operational amplifier is an unit gain  
3 operational amplifier.

1        17. A driving apparatus for receiving an input voltage  
2 at an input terminal and generating an output voltage at an  
3 output terminal, comprising:  
4        an output buffer receiving the input voltage and  
5           pulling the output voltage down to a first level  
6           lower than the input voltage during a first  
7           period; and  
8        an operational amplifier electrically coupled between  
9           the input and the output terminal, and  
10           selectively turned on to pull the output voltage  
11           up to a second level substantially the same as  
12           the input voltage during a second period after  
13           the first period.

1        18. The driving apparatus as claimed in claim 17,  
2 wherein the operational amplifier is turned off when a level  
3 of the input voltage is lower than a predetermined  
4 threshold.

1        19. The driving apparatus as claimed in claim 17,  
2 wherein the operational amplifier is turned off when a level  
3 of the input voltage is higher than a predetermined  
4 threshold.

1        20. The driving apparatus as claimed in claim 17,  
2 wherein the output buffer comprises:

3       a bias circuit activated during a third period before  
4           the first period to generate bias voltages; and  
5       a source follower activated and biased by the bias  
6           voltages during the first period.

1       21. The driving apparatus as claimed in claim 20,  
2 wherein the output buffer further comprises a short circuit  
3 for selectively shorting the input terminal and the output  
4 terminal.

1       22. The driving apparatus as claimed in claim 21,  
2 wherein the short circuit is activated during a fourth  
3 period after the second period.

1       23. The driving apparatus as claimed in claim 17,  
2 wherein the operational amplifier is an unit gain  
3 operational amplifier.